

The Army Executes New Network Modernization Strategy

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Starting in October 2012, the Army began to equip brigade combat teams that will deploy in 2013 with Capability Set 13. This is the Army's first package of radios, satellite systems, software applications, smartphone-like devices, and other network components that provide integrated connectivity from the static tactical operations center to the commander on the move to the dismounted soldier.

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Agile XP

Lean Software Development

backlogs working prototypes





A soldier uses Capability Set 13 equipment at Fort Drum, N.Y., in October 2012. The Army's new Capability Set 13 network will reduce units' reliance on fixed infrastructure, extend the range of communications, and improve battlefield awareness at the lowest levels.

This capability set is the first fielded as part of the Army's new Agile Capabilities Life Cycle Process, or "Agile Process" for short. Rather than develop network systems independently and on their own timelines, the Army is integrating capabilities upfront in government-owned laboratories, having soldiers test-drive them at Network Integration Evaluations and delivering complete capability sets aligned with the Army Force Generation cycle. As one capability set is fielded, the Army, through the Network Integration Evaluation, is developing and evaluating the next capability set.

This process allows the Army to assess capability gaps, rapidly form requirements, solicit mature industry solutions, and perform integrated developmental and operational tests. To date, the Network Integration Evaluations have yielded more than \$6 billion in cost avoidance from the restructure of Army programs and the consolidation of test practices.

Although the Network Integration Evaluations themselves are conducted every 6 months at Fort Bliss, Texas, and White Sands Missile Range, N.M., they rely on a constant churn of activity in Army laboratories more than 2,000 miles away. This lab-based risk reduction, conducted in new facilities at Aberdeen Proving Ground, Md., is critical to the successful execution of the evaluations, which involve 3,800 soldiers, more than 300 vehicles and dozens of networked systems spread over hundreds of miles of mountain and desert terrain. By replicating the Network Integration Evaluations network in the lab environment, engineers can resolve integration issues before systems get to the field—reducing test costs and

sparing soldiers from trying to troubleshoot technology in the middle of the exercise.

For the first two Network Integration Evaluations, held in 2011, the Army was just beginning to implement the Agile Process and stand up its laboratories, and therefore could conduct only limited risk reduction before the operational exercises. Most network integration took place in the field, which meant there was less time available for running mission threads. However, for Network Integration Evaluations 12.2 and 13.1 in 2012, the Army was able to complete all phases of the Agile Process prior to beginning the evaluations.

Under the Agile Process, companies respond to a "sources sought" notification detailing the Army's defined capability gaps, and then enter the laboratories for technology evaluation, assessment, and integration. The lab assessments inform the Army's choices on what systems will participate in the semi-annual Network Integration Evaluations and provide detailed "score cards" to industry on how the technologies performed and what could be improved in the future.

The Agile Process gives the Army a unique opportunity to evaluate vendor systems early and provide technical recommendations to validate the claims vendors make on their products. Each vendor receives a detailed score card and technical report explaining what tests were performed and the results of the tests. This allows the vendor to see what the Army is looking for and make potential improvements to their products.

Once systems pass this phase, they enter C4ISR (Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance) Systems Integration Lab (CSIL) to perform Lab-based Risk Reduction activities, where the NIE network is replicated in a lab environment. All systems—both programs of record and industry solutions—going to the NIE must first go through Lab-based Risk Reduction at the CSIL, where system functionality, interoperability, all configuration settings and mission threads are validated prior to going to NIE.

Lab-based Risk Reduction gives the Army a venue to measure technical maturity in a system-of-systems context, and also benefits industry by allowing companies to plug their systems into the Army network baseline and discover any interoperability challenges before soldiers encounter them during the Network Integration Evaluation.

For the last two evaluations, the Army has taken an innovative approach to come up with a quantifiable measure called the Network Integrated Readiness Level to assess the integrated readiness of the system within the relevant Army network. This is similar to a Technical Readiness Level (TRL) but instead evaluates how the system integrates into the bigger network. This helps measure various systems on equal footing. For example, some systems coming into Lab-based Risk Reduction with a high TRL rating only managed a marginal Network Integrated Readiness rating due to interoperability issues.

Lab-based Risk Reduction is the first time the vendors enter the Army ecosystem and have the opportunity to test and integrate their system within the end-to-end network construct. By participating, vendors increase their chances to be in NIE

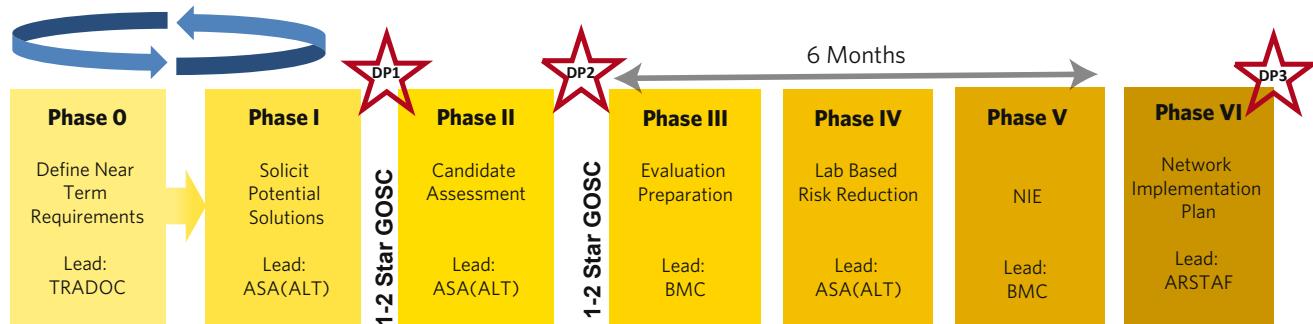
and work well, rather than dealing with integration issues in the field. This helps the vendor as well as the Army to be able to evaluate the solutions on their DOTMLPF [doctrine, organization, training, materiel, leadership and education, personnel and facilities] and technical merits.

With a brigade's worth of hardware and software in close proximity, the lab is a more cost-effective environment to isolate and fix a problem than Fort Bliss and White Sands. The configuration changes, software and firmware updates, added encryption, and other fixes applied in the CSIL also save valuable time. For example, an integration problem between handheld devices and Army mission command software for Network Integration Evaluation 13.1 was discovered within two hours after installation and quickly resolved—something that would have taken weeks in the field.

In all, more than 150 issues were identified and fixed in the lab prior to Network Integration Evaluations 12.2 and 13.1, resulting in a more stable network for evaluation by the 2nd Brigade, 1st Armored Division (2/1 AD), the operational brigade combat team that conducts the evaluations. Those improvements also will pay off with the fielding of an integrated, validated Capability Set 13/14 network. Using the lab to measure and improve interoperability between different network systems saves on test costs, reduces risk for the system owners, and ultimately creates a more seamless user experience for the soldier.

The CSIL is just one of several laboratories at Aberdeen Proving Ground built as part of the recent Base Realignment and Closure move of C4ISR organizations to Maryland. The laboratories are linked through direct fiber optic connectivity—creating an integrated environment for government and industry

Figure 1. The Army Agile Process Life Cycle



- Enables the Army to keep pace with industry and technological advances
- Accelerates network modernization to a rate unachievable by traditional acquisition strategies in a more cost-effective manner
- Provides deploying units better capabilities more quickly
- Incrementally improves the overall Network over time
- Directly supports capability set management in identifying critical operational gaps and solutions
- Provides operational validation of these solutions and the Network architecture baseline for inclusion in current or future capability sets
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to measure system performance and interoperability. The facilities that support the Network Integration Evaluation, Agile Process, and capability set fielding include settings focused on tactical radios, satellite communications, intelligence, mission command applications, and the integration of C4ISR equipment onto various vehicle platforms.

This distributed lab environment, organized by function, provides a controlled setting in which the Army can conduct developmental tests both on individual systems and on an integrated network. The Army test community has also embraced the Lab-based Risk Reduction concept, using the new facilities to evaluate different data collection methods and determine the best approach for each system prior to operational tests.

The lab work pays dividends at the Network Integration Evaluations, where Army engineers apply the validated network designs as they integrate the fleet of tactical vehicles used by 2/1 AD. Additional risk reduction and verification also are conducted in the Integration Motor Pool at Fort Bliss, prior to handing over a stable network to the brigade.

The unit then evaluates network performance by executing various Training and Doctrine Command-developed scenarios, in varying environmental conditions, against a "hybrid threat" opposing force. Upon conclusion of the Network Integration

Evaluations, the Army provides feedback to programs of record and industry partners so they can make necessary adjustments to their technologies.

The reports produced out of Network Integration Evaluations not only address technical performance, but also systems' impact on other areas such as doctrine, training, and basis of issue—who in a unit receives the capability and how it will be used. Army leadership then uses these recommendations to make fielding decisions, beginning with Capability Set 13 as the inaugural output of the Agile Process.

Capability Set 13 marks the first time the Army is delivering network systems as an integrated communications package that spans the entire brigade combat team formation. That has required a new, highly synchronized approach to production and deliveries of CS 13 equipment, aligned with unit training schedules and deployment dates. However, the lessons learned during Lab-based Risk Reduction and Network Integration Evaluations—from software interoperability to vehicle integration to soldier training—are paving the way for successful fielding of the capability set. CS 13 is on track to field to up to eight Infantry Brigade Combat Teams—with priority to units deploying or preparing to deploy to Operation Enduring Freedom—from 2012–2013.

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